

**SAMPLE**



**STATE OF HAWAII  
DEPARTMENT OF AGRICULTURE**

**WAIMANALO 60 MG RESERVOIR**

**EMERGENCY ACTION PLAN**



**WAIMANALO 60MG RESERVOIR  
EMERGENCY ACTION PLAN**

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## **I. PURPOSE**

This plan is designed for use by the Dam Facility Operations and Emergency Services Personnel to prepare for and respond to dam failure incidents.

The purpose of this plan is to prescribe the procedures to be followed in the event of an emergency caused by an unusually large flood or malfunction of the Waimanalo 60 MG Reservoir. It describes the actions necessary to accomplish the warning and evacuation of the area that would be inundated.

The plan is intended to protect life and property downstream from damage of a partial dam failure, dam failure, or excessive discharge event. The plan does not address routine operational measures or preventative mitigative measures such as opening outlet gates or closing inflow to the reservoirs. These preventative measures are the responsibility of the owner. The plan addresses incidents that occur beyond the limits of the owner or operator's control.

This plan is an emergency response document and is required to be distributed to all personnel/agencies involved. Further education and information also needs to be relayed to downstream occupants, as well as practice "drills" with active participants.

This plan emphasizes certain procedures that are necessary to cope effectively with a particular dam crisis. The plan is designed to:

1. Establish warning procedures
2. Outline procedures for initiating evacuation
3. Identify evacuation routes to be used
4. Plan traffic control measures
5. Identify methods for moving people without their own transportation.
6. Identity procedures for the security of the perimeter and interior of the affected area during and after evacuation.
7. Identify procedures for allowing evacuees to return to their homes.
8. Indicate which organizations are responsible for specific functions and for furnishing materials, equipment, and personnel resources.



## II. EMERGENCY PROCEDURES

The major decision when observing a threatening incident at a dam is to clearly classify the level of urgency. This will prioritize the action steps to undertake. Two basic missions confront the individual reporting the incident:

- 1) Alert and evacuate downstream residents in a timely manner, and
- 2) Correct the problem at the dam.

There is some judgement required in deciding which mission to pursue first. The more rapid the deterioration of the structure or conditions, the more appropriate it is to evacuate the downstream public first. Even when conditions indicate that monitoring and observations are top priority, it is often wise to also issue warnings so that downstream entities can prepare to respond if necessary.

In the event that the dam is in the process of failing, there may be only time and resources to evacuate the downstream residents. In all circumstances, the timeliness of the observation and rapidity of the response to a problem will determine the severity of the damage and successful prevention of a failure.

**Note:** Most dam breaks may occur in the first 3 hours of inception of water seepage. Time is of essence to determine safety status of dam/reservoir in an emergency. If dam is in process of breaking, go immediately to telephone notification process. Evacuate persons in the inundation zone.

Once a threatening incident has been observed, there are several steps which must be performed to address an emergency and restore the safety of the dam. The process is outlined on the following flow chart.



### III. EMERGENCY DETECTION, EVALUATION

In this plan, four levels of urgency are identified:

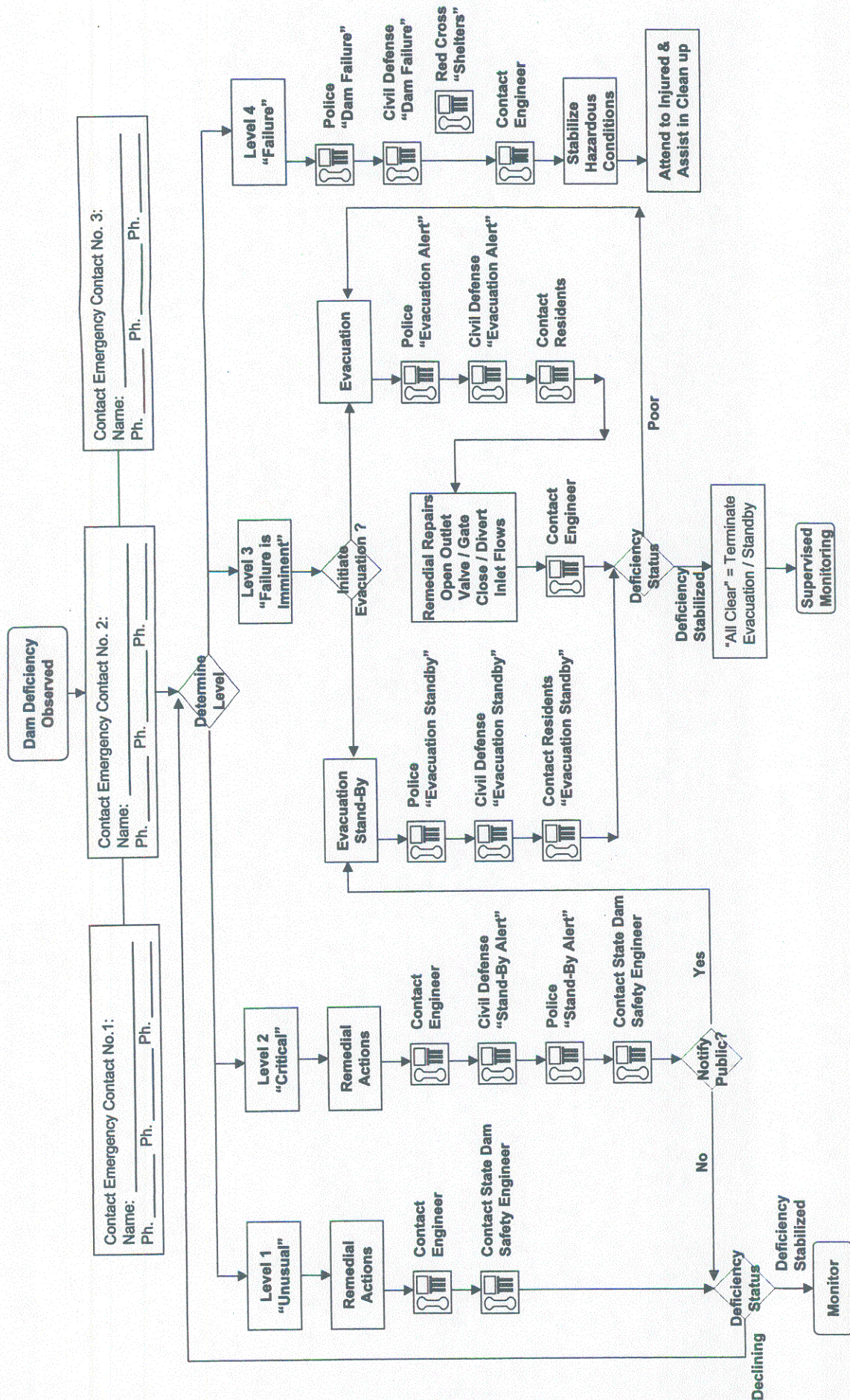
1. **UNUSUAL THREAT** - A new or worsening condition has developed which could affect the safety of the dam.
2. **IMMINENT FAILURE** - An obvious condition is present which could lead to a failure if it should worsen. At this level remedial repairs will likely mitigate or even prevent a failure of the dam. Also, contact the Police and/or the local Civil Defense Agency that it **MAY** be necessary to evacuate the downstream residents. **A general evacuation is normally not necessary at this level, but it is appropriate to begin preparations for evacuation.**
3. **FAILURE IN PROGRESS** - This level is identified by the occurrence of uncontrolled reservoir release. In this case, the process of failure is active and dynamic. However, there will be occasions where remedial measures can prevent a release of the entire reservoir and minimize the consequences of a failure. Also, contact the Police and/or the local Civil Defense Agency that it **MAY** be necessary to evacuate the downstream residents and that emergency personnel as well as downstream residents should all be on **STAND-BY ALERT**.
4. **DAM FAILURE** - The dam has failed and flooding is in progress.

#### Additional Trigger Points

In addition to various failure symptoms, there are additional "trigger points" for which the reservoir staff should be aware of and have procedure for. Some examples are as follows:

- Maximum Reservoir Level
- Spillway Flow Level which exceeds downstream capacity.
- Spillway Invert Level
- Evacuation Level
- Standby Level
- Safe Operating Level as determined by Previous Studies.







This section is to be composed jointly by the Dam Operations / Maintenance staff and the Dam Owner. The following table is provided as a simple guide for classifying the level of urgency based on the observed conditions.

Failure Mode	Level of Urgency		
	Unusual Threat	Imminent Failure	Failure in Progress
Piping / Seepage	Very minor sediment in seepage flows or toe drains, or boils or whirlpools	Significant Sediment in seepage or toe drains	Piping has resulted in settlement or sinkhole in embankment
Sinkhole	Hole or depression in non-critical area	Hole at outlet or tail section, no obvious progression	Unstable hole at outlet or tail section shows potential for progressing.
Settlement	Minor Settlement	Moderate settlement	Significant settlement resulting in water overtopping the dam.
Cracking	Dry open crack in embankment	Crack with displacement of minor flow	Crack with erosive flow.
Erosion			
Back-Cutting of Spillway or Outlet Channel	Erosion downstream of dam progressing slowly	Erosion downstream of dam progressing rapidly	Erosion is close to reservoir, or spillway structure is washed out.
Wave Erosion	Minor erosion of crest height or minor scarping of upstream face	Moderate erosion of crest height or significant seepage or overtopping problem	Prominent erosion of crest height or rapidly progressive loss of upstream face.
Overtopping	Water at dam crest, or water near dam crest and severe storm approaching.	Flood overtopping dam and causing minor erosion.	Flood overtopping dam and washing it out.
UpStream Dam Failure		Upstream Dam with Critical Deficiency or high level.	Upstream dam in process of failing.
Slide	Slide evident. Small or surface slide with minor reduction of embankment cross section and minor crest settlement.	Large slide which significantly reduces embankment cross section, but does not result in a significant seepage or overtopping problem.	Large slide which significantly reduces embankment cross section and results in a significant seepage or overtopping problem.
Saturation	Downstream slope of embankment saturated, embankment gets soft, minor sloughing may occur.	Saturation results in slides which narrow embankment cross section of settlement of the crest which reduces freeboard, but only minor seepage occurs.	Saturation results in slides which narrow embankment cross section or settlement of the crest which reduces freeboard and significant seepage occurs or water begins overtopping dam.
Earthquake		Earthquake tremors observed near dam structure.	More earthquake tremors anticipated.
Outlet Failure	Broken gate; conduit with pinhole size seeps	Cracked or perforated conduit with concentrated seeps with some sediment piping; deeply scoured or undermined conduit.	Obvious sediment piping into or adjacent to the outlet conduit which results in the embankment and/or conduit washing out.



#### **IV. REMEDIAL REPAIRS**

In most cases, the safety increases as the reservoir is lowered. However, there are several considerations in lowering the reservoir. If the problem at the dam is the result of a problem at the outlet section, it may be necessary to close the outlet gate and lower the reservoir by an alternate means. If the outlet is functioning safely, but has a small capacity, then it may be necessary to augment the outlet draw down capability with an alternate method. Operational personnel should know the potential ramifications of fully opening the outlet gate/valve, and whether such action may cause unnecessary flooding or damage downstream.

These factors should be taken into account as the situation permits. One must monitor what happens when the outlet gate is open and shut the gate if it appears to be making the situation worse. After the State Conservation Engineer and the State Dam Safety Engineer arrives, they will determine the safe storage level or needed restriction. In the mean time, the Department of Agriculture must use its best judgement. Perhaps the best rule of thumb is, "**When in doubt, open the outlet.**"

#### **POTENTIAL PROBLEMS AND IMMEDIATE EMERGENCY ACTIONS**

The following are emergency actions that an owner should perform immediately for common problems that can be associated with serious incidents. The problems may occur by themselves or in conjunction with each other. The actions are simple emergency solutions that may be followed by additional action under the guidance of an engineer.

#### **BACKCUTTING OF SPILLWAY**

1. Lower the water level to reduce flows over the spillway by opening the outlet.
2. Close or divert inlet flows to the reservoir.
3. Establish a mark where the spillway ends. Monitor the rate of backcutting and the rate of flows through the spillway. Also note the duration and rate of outlet flows.
4. Provide temporary protection at the eroding surface by placing plastic sheets, riprap, or other suitable material.

#### **CRACKING**

1. Lower the water to a level below the cracking.
2. Close or divert inlet flows to the reservoir.
3. Place markers or instrumentation on the cracks which allows monitoring of the dimensions of each significant crack. Document observations.

#### **OUTLET FAILURE**

1. Close the outlet gates to protect the embankment from piping or to protect the conduit from damage.
2. Close or divert inlet flows to the reservoir.
3. Lower the water level. Lower the water level by pumping, siphoning, or construction of a temporary spillway.
4. Monitor the outlet section for settlement, development of sinkholes, and piping. Install additional movement monuments to aid monitoring. Observe outlet discharge for quantity of flow and signs of conduit erosion.



### **OVERTOPPING**

1. Fully open outlet to reduce overflows.
2. Close or divert inlet flows to the reservoir.
3. Monitor the depth, duration, and locations of overtopping. Watch for erosion, backcutting and slides
4. Place sandbags or other material along the crest to increase freeboard and force more water through the spillway and outlet. Give priority to the maximum section or areas with the greatest downstream hazard.
5. Provide erosion protection to the downstream slope by placing plastic sheets or other materials over eroding areas.
6. Divert flood waters around the reservoir basin, if possible.
7. Increase spillway capacity by excavating a temporary spillway in an area where the foundation materials are erosion resistant. For example: remove a section of dam that is not tall and is founded on a broad flat erosion-resistant soil or rock. (EXTREME CARE should be exercised in the creation of any new spillways. This option should be approved/determined by an engineer prior to construction, and preferably prior to any emergency. Unless provisions are provided to protect against erosion, this should be used only as an emergency option).

### **PIPING**

1. Check if the piping is occurring in the outlet conduit. If there is no relation to the outlet, then open the outlet to lower the reservoir.
2. Close or divert inlet flows to the reservoir.
3. If it is determined that the embankment is piping through the outlet conduit, then close the outlet gate and use an alternative method to lower the water level.
4. If the entrance area of the leak in the reservoir basin can be found, try to plug it off with whatever materials are available such as hay bales, manure, mattresses, bentonite, plastic, etc.
5. Place a protective sand and gravel filter over the exit area to hold materials in place. If sand / gravel are not readily available, dirt or other materials could be used as a temporary patch to assist in controlling the flow of water.

### **SATURATION OF EMBANKMENT**

1. Lower the water level.
2. Close or divert inlet flows to the reservoir.
3. Continue frequent monitoring for signs of concentrated seepage, cracking, sloughing, and slides.



### **WAVE EROSION OF EMBANKMENT**

1. Lower water level to an elevation below the damaged area.
2. Close or divert inlet flows to the reservoir.
3. Determine the dimensions and mark the location of each eroded area. Monitor the problem areas and document your observations.
4. Immediately restore the freeboard by placing sandbags or another expedient material in the damaged areas to prevent further embankment erosion.
5. Continue close observation and repeat temporary repairs of the damaged areas until the storm is over.

### **SETTLEMENT OF THE EMBANKMENT**

1. Determine if the settlement is related to piping and if there is piping through the outlet conduit.
2. If the settlement is related to piping through the outlet conduit, then close the outlet gate and lower the water level by pumping, siphoning, or a temporary spillway.
3. If the settlement is not related to piping through the outlet conduit, then lower the water level by releases through the outlet.
4. Close or divert inlet flows to the reservoir.
5. Lower the water level.
6. Survey existing monuments to determine the settlement. Install additional monuments as necessary. Continue to monitor settlement with time. Watch for piping and sinkholes.

### **SINKHOLE**

1. Check if the sinkhole is the result of piping through the outlet conduit. If there appears to be no relation to the outlet, then open the outlet to lower the reservoir.
2. Close or divert inlet flows to the reservoir.
3. Observe the seepage conditions and begin periodic monitoring. Document your observations by taking photos, making notes, and including time references.
4. If there is minor clear seepage, wait for your engineer's evaluation.
5. If there is muddy seepage and piping is likely, coordinate with your consultant and contractor to fill in the sinkhole and place a filter over the seepage area.
6. If there is significant leakage and piping, coordinate with the Oahu Civil Defense Agency / Police to prepare an evacuation.
7. Use readily available materials to fill the sinkhole.

### **SLIDES**

1. Lower water level at a rate and to an elevation which are judged to be safe under the slide condition. If the outlet is damaged or blocked, then pumping, siphoning, or a temporary spillway may be required.
2. Close or divert inlet flows to the reservoir.
3. Restore lost freeboard if required. This may entail placing sandbags or fill on crest at the slide area.
4. If the water level cannot be lowered and further sliding is likely, then stabilize the slide by constructing a berm on the toe area with additional rock or soil.



## **V. EVACUATION PLAN & INUNDATION AREA**

The map shown on Figure 1 identifies the anticipated area of inundation caused by an uncontrolled sudden release or failure of the Waimanalo 60MG Reservoir.

A more detailed assignment and plan of the evacuation sequence and responsibilities should be coordinated with the Department of Agriculture, Oahu Civil Defense, Local emergency response crews (police & fire), and members of the neighborhood board. Suggested road closure points are indicated on Figure 1.

Guidance in each of the functional areas are outlined in the City Emergency Operations Plan, at Annex S, Appendix 5, presently being modified and supplemented by the hazard specific instructions.

Also, a list of residents living within the inundation zone will be updated annually, and included as an Appendix to this plan. (DOA presently gathering information)



## **Figure 1**

Insert:

Inundation Maps

Road closure areas



## VI. ROLES AND RESPONSIBILITIES:

### A. The Department of Agriculture will:

1. Educate residents in downstream inundation areas in the appropriate response procedures to be followed when unsafe conditions exist at their reservoir.
2. Promptly notify the State Civil Defense, Oahu Civil Defense Agency and the Honolulu Police and Fire Departments of any unsafe condition affecting their facilities.
3. Evaluate unsafe reservoir conditions, accomplish the warning and evaluation of threatened populations and, as necessary, in preparing media releases.

### B. Oahu Civil Defense Agency (OCDA)

1. Assist the Department of Agriculture in educating the public on appropriate responses to unsafe conditions.
2. Upon notification that an unsafe condition exists at the Waimanalo 60 MG reservoir:
  - a) Determine the time available for response (by a licensed civil engineer, if available).
  - b) Alert all necessary response agencies.

### C. Oahu Civil Defense District Volunteer Organizations

1. Assist HPD in traffic control, warning and evacuation.
2. Coordinate volunteer use with their respective District Police Station Commanders or their on duty representatives.

### D. American Red Cross (ARC)

When requested by OCDA or HPD:

1. Activate, staff and operate identified shelters for evacuees
2. Coordinate medical and nursing care for evacuees with DOH.

### E. State Department of Health, Emergency Medical Services System Branch (DOH)

When requested by OCDA or HPD:

1. Activate, staff and coordinate services with American Red Cross.
2. Arrange and provide for medical and nursing care for evacuees in shelters.

### F. Honolulu Fire Department (HFD)

1. Within capabilities, assist HPD in warning and evacuation procedures.

### G. Honolulu Police Department (HPD)

Upon notification by OCDA or the Department of Agriculture that an unsafe condition exists:

1. Determine the time available for response.
2. Accomplish necessary notifications.



3. When directed by OCDA:
  - a) Conduct warning and evacuation of inundation zones.
  - b) Immediately establish roadblocks on the perimeter inundation areas.
  - c) Contact the Fire Alarm Bureau and Ambulance Dispatch and coordinate the use of available units in warning and evacuation.
  - d) Maintain security for areas that have been evacuated.

H. Supporting State Departments:

1. Department of Land and Natural Resources. Engineering Branch. Dam Safety Section:
  - a) Assist the Department of Agriculture in educating the public on appropriate responses to unsafe conditions.
  - b) Advise and assist OCDA, HPD, and DOA in evaluating and responding to unsafe dam conditions.
2. State Civil Defense:
  - a) Coordinate all state departments and support services when City and County capabilities are exceeded.
3. Other Departments:
  - a) Provide assistance to the City in accordance with departmental authority, functions, resources, and capabilities.

I. Cooperating Agencies:

Community, neighborhood, charitable and church groups will provide volunteer relief programs for evacuees and victims in accordance with preplanned arrangements and mutual agreements with the American Red Cross.



We, the undersigned, on the date indicated, have reviewed the requested support activity in the Emergency Action Plan for the Waimanalo 60 MG Reservoir. Our support action will be executed in accordance with existing Standing Operation Procedures and the City and County of Honolulu Emergency Operations Plans.

State Department of Agriculture

12/13/01  
Date

U.S. Dept. of Agriculture, Natural Resources Conservation Service

04/17/02  
Date

U.S. Army Corps of Engineers, Office of Emergency Management

4/17/02  
Date

Department of Defense, State Civil Defense

4/19/02  
Date

State Department of Land & Natural Resources, Dam Safety Section

4/15/02  
Date

State Department of Health, Emergency Medical Services System

4-16-02  
Date

City & County of Honolulu, Oahu Civil Defense

4-18-02  
Date

City & County of Honolulu, Honolulu Fire Department

4-18-02  
Date

City & County of Honolulu, Honolulu Police Department

4-18-02  
Date



## **VII. EMERGENCY TERMINATION PROCEDURES**

Accomplished as mutually agreed upon by the Department of Agriculture (reservoir owner) and the Oahu Civil Defense Agency. If condition level reaches "Imminent" or "Failure in Progress" than termination of emergency shall also be as mutually agreed upon by the State Dam Safety Office.

After termination is decided, all emergency response personnel should be notified.



## VIII. SUPPLIES AND RESOURCES

In an emergency situation, equipment and supplies may be needed on short notice, such as sandbags, riprap, fill materials, equipment, and laborers. The table below lists the supplies and indicates how to access them.

Item	Contact	Location
Earthmoving equipment		Waimanalo Irrg. System
Sand and Gravel		
Sandbags		
Pumps		Waimanalo Irrg. System
Pipe		Waimanalo Irrg. System
Laborers		Waimanalo Irrg. System
Other		





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## APPENDIX A



## APPENDIX

### APPENDIX A - DISTRIBUTION LISTING

P.E.

State Conservation Engineer  
USDA, Natural Resources Conservation Service  
P. O. Box 50004  
Honolulu, HI 96850-0001

Vice Director of Civil Defense  
Department of Defense  
3949 Diamond Head Road  
Honolulu, HI 96816-4495

Honolulu District Director

Office of Emergency Management  
U.S. Army Corps of Engineers  
Building 230  
Attn: CEPOH-EM  
Fort Shafter, HI 96858-5440

Administrator  
Oahu Civil Defense Agency  
City & County of Honolulu  
650 So. King Street  
Honolulu, HI 96813

P.E.

Branch Chief, Engineering Branch  
1151 Punchbowl Street  
Honolulu, HI 96813

Police Chief  
Honolulu Police Department  
801 So. Beretania Street  
Honolulu, HI 96813

Branch Chief

Emergency Medical Service System Branch  
State Department of Health  
3627 Kilauea Avenue, Room 102  
Honolulu, HI 96816

Fire Chief

Honolulu Fire Department  
3375 Koapaka Street  
Honolulu, HI 96819





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## APPENDIX B



## APPENDIX B - PHONE LISTINGS:

The existence of any problems shall be reported to the following:

1. Oahu Civil Defense (OCDA), Ph:
2. Honolulu Police Department (HPD), Ph: 911
3. Honolulu Fire Department (HFD), Ph: 911
4. State Dept. of Land and Natural Resources (DLNR), Dam Safety Section,  
Ph:
5. State Civil Defense (SCD), Ph:
6. Natural Resources Conservation Service of the U.S. Department of Agriculture,  
Ph:
7. U.S. Army Corps of Engineers, Office of Emergency Management, Ph:
8. State Department of Health (DOH), Ph: \_\_\_\_\_ (after hours: \_\_\_\_\_)

### DEPARTMENT OF AGRICULTURE:

#### Owner's Personnel:

Primary Contact: \_\_\_\_\_ B: \_\_\_\_\_ Cell: \_\_\_\_\_  
Pgr: \_\_\_\_\_

Alternate: \_\_\_\_\_ B: \_\_\_\_\_ H: \_\_\_\_\_

Alternate: \_\_\_\_\_ B: \_\_\_\_\_ Pgr: \_\_\_\_\_

Engineer: \_\_\_\_\_ B: \_\_\_\_\_ H: \_\_\_\_\_

Contractor to effect remedial repairs or actions:

\_\_\_\_\_ B: \_\_\_\_\_ H: \_\_\_\_\_

\_\_\_\_\_ B: \_\_\_\_\_ H: \_\_\_\_\_

\_\_\_\_\_ B: \_\_\_\_\_ H: \_\_\_\_\_

\_\_\_\_\_ B: \_\_\_\_\_ H: \_\_\_\_\_

\_\_\_\_\_ B: \_\_\_\_\_ H: \_\_\_\_\_

NOTE: Contractors are pending due to the new Statewide procurement regulations.



**CONTACT DIRECTORY**  
**for**  
**Waimanalo 60 MG Reservoir**

**U.S. DEPARTMENT AGENCIES**

**U.S. Department of Agriculture:**

Natural Resources Conservation Service  
State Conservation Engineer  
Engineer

**U.S. Army Corps of Engineers:**

Office of Emergency Management  
P.E., Natural Disaster Manager (H) (cell)  
Honolulu District Manager (H) (cell)  
Dam Safety Coordinator

**STATE DEPARTMENT AGENCIES:**

**Department of Land & Natural Resources:**

Engineering Branch  
P.E., Dam Safety Engineer (pgr)  
P.E., Flood Control Engineer (pgr)  
P.E., Branch Head

**State Civil Defense:**

Civil Defense Division  
Vice Director  
(Request to speak to SCD Duty Officer during other than normal working hours)

**State Department of Health:**

Emergency Medical Service System Branch  
(After hours -State Hospital Dispatcher)  
(personal cellular)

**CITY & COUNTY AGENCIES:**

Honolulu Fire & Police Departments 911

**Oahu Civil Defense Agency:**

Acting Administrator  
(Call 911 after hours, dispatcher will contact duty officer)





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## APPENDIX C



## APPENDIX C - RESERVOIR DATA INFORMATION

### A. Description

This reservoir is described as follows:

1.     **Location:**     The reservoir is located at the mauka end of Mahailua Street in Waimanalo. (41-921 Mahailua Street)
2.     **Purpose:**     Irrigation only
3.     **Date Built:**   July 15, 1993 (Dedicated)
4.     **Major Physical Data:** See Appendix.



WAIMANALO RESERVOIR  
WAIMANALO WATERSHED  
PERTINENT DATA

CLASS OF STRUCTURE	C
RESERVOIR CAPACITY	
Emergency Crest (Elev. 309)	MG
RESERVOIR AREA	
Emergency Crest (Elev. 309)	ac.
DAM EARTHFILL	
Crest Elevation	ft.
Top Width	ft.
Maximum Height of Fill	ft.
EMERGENCY SPILLWAY	
Crest Elevation	ft.
Freeboard Design-	
Controlled Drainage Area	ac.
Rainfall (PMP)	in.
Storm Duration	hrs.
Peak Outflow (PMP)	cfs
Max. Reservoir W.S. Elev.	ft.
Capacity at Top of Dam Elev.	cfs
DIVERSION FOR OUTSIDE	
RESERVOIR DRAINAGE AREA	
Drainage Area	ac.
Rainfall (PMP)	in.
Storm Duration	hr.
Runoff Peak Flow.	cfs
IRRIGATION OUTLET PIPE	
Outlet Elevation	ft.
Conduit Diameter	in.
EARTHWORK QUANTITIES	
Dam Embankment	c.y.
Excavation	c.y.
Maximum Depth of Excavation	ft.



## **Reservoir Data Information & Plan information**

Insert:

Detailed Reservoir Information

As built plan sheets

Grading plan

Boring information

Embankment and profile sheets

Cross sections

Plan of pipe system





## APPENDIX D



## APPENDIX D - SITE MAP

List locations of outlets, inlets, and diversions/gates/valves:

1. The Waimanalo 60 MG Reservoir is designed with one (1) inlet and one (1) outlet, both are underground ductile iron pipe. Pipe sizes vary in accordance with construction design.
2. Control valve for the 16 inch inlet pipeline is in manhole located at station 3+95, see Figure 2.
3. Control valves for the 24 inch outlet pipeline and the 12 inch drainline is located at station 7+35, within the premises presently leased to dba  
TMK (1) 4-1-010:003, see Figure 2.
4. The water source originates within the Maunawili Valley Watershed and is transmitted through the Ani Ani Nui Ridge. When necessary, the Irrigation District Manager of the Waimanalo Irrigation System Branch may direct its personnel to divert the water sources within Maunawili Valley to prevent the water level in the Waimanalo 60 MG Reservoir from achieving capacity.

List phone number and name of individuals with keys/combinations: See Appendix B – Phone Listings, *Owner's personnel*.

A plan layout sheet of the dam and spillway is attached. (See Appendix C)



## **Figure 2**

Insert:

As-built drawings

Plan of pipe system, inlet, outlet, spillway, etc...





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## APPENDIX E



## **APPENDIX E - LATEST INSPECTION OBSERVATIONS**





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## APPENDIX F



## **APPENDIX F - INITIAL OBSERVATION OF CRITICAL CONDITION**

The State Department of Agriculture is responsible for initially identifying the existence of any of the previously discussed critical conditions.

The Irrigation District Manager of the Waimanalo Irrigation System Branch in the Department of Agriculture shall be responsible for monitoring the dam, checking the observation wells to ensure that they are dry, ensure that the outlet works are in good operating condition, and that there is minimal or no water exiting the toe drains at the outlet.





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## APPENDIX G



## APPENDIX G - PLAN MAINTENANCE

This plan will be reviewed annually by the Department of Agriculture and revisions shall be provided to all supporting response agencies. Whenever new data is received which would require the modification of the down channel inundation zones or the evacuation strategy, the EAP shall be amended and revised copies distributed to all supporting agencies. During the review, special attention will be given to:

1. The accuracy and completeness of formatted public address, public service and Emergency Broadcast Systems scripts currently on file in OCDA.
2. The status of current and projected education and awareness programs dealing with the warning and evacuation of threatened populations below dams and reservoirs located within the City.